REMARKS/ARGUMENTS

This is intended as a full and complete response to the Final Office Action dated February 3, 2010, having a shortened statutory period for response set to expire on May 3, 2010. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1-55 are pending in the application. Claims 1-55 remain pending following entry of this response.

Claim Rejections - 35 U.S.C. § 102

Claims 1-3, 5-6, 10, 15, 17, 19, 21, 24-25, 29, 32-33, 35-36, 40-42, and 45-52 are rejected under 35 U.S.C. § 102(e) as being allegedly anticipated by *Kishigami et al.* (U.S. Patent No. 6,642,888, hereinafter, "*Kishigami*"). Applicants respectfully traverse this rejection.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

In the present case, *Kishigami* fails to teach each and every element as set forth in the claims. For example, *Kishigami* fails to teach "selecting at least one different combination of scalars, each combination including at least one scalar for at least one row of the base matrix, one scalar per row, each scalar being a real or complex value" and "forming at least one steering matrix by multiplying a base matrix with the at least one different combination of scalars, wherein one steering matrix is formed by each combination of scalars" as recited in claim 1.

In the current Office Action, the Examiner refers to Equation 12 of *Kishigami* and corresponding description as teaching "selecting at least one different combination of scalars, each combination including at least one scalar for at least one row of the base matrix, one scalar per row, and each scalar being a real or complex value" (page 4). The Examiner refers to

element a(θ) in Equation 12 as corresponding to the "combination of scalars" recited in the claim and states that col. 4, lines 50-51 states that "θ can be selected for a specific antenna." However, col. 4, lines 50-51 only teach that "||x|| is the norm of vector x, and a(θ) is a normalized steering vector of the array antenna." *Kishigami* teaches only that "a(θ) is a complex response (hereinafter called a steering vector) of the array antenna as a function of azimuth θ" (col. 2 lines 6-8). Therefore, *Kisihigami* is silent with respect to "selecting at least one different combination of scalars" as recited in claim 1. In fact, the only "selecting" described in *Kishigami* is with reference to selecting complex digital signals or selecting antennas.

As another example of failing to disclose each and every element of the claim, Equation 12 of *Kishigami* does not teach "each combination including at least one scalar for at least one row of the base matrix, *one scalar per row*" as recited in claim 1 (emphasis added). Equation 12 teaches that a unitary matrix Q_M may be multiplied with a steering vector a(θ) to produce real vector b(θ). Applicants respectfully submit that with matrix multiplication (including multiplying a matrix with a vector), there cannot possibly be one scalar per row as required by claim 1. According to matrix multiplication, the element *i,j* of the matrix product of matrices [A] and [B] will be the dot product of row *i* of [A] and column *j* of [B]. For example, if row *i* of [A] is [1 2 3 4] in a 4 x 4 matrix and column *j* of [B] is [a b c d], then element *i,j* of [A][B] is equal to (1)(a) + (2)(b) + (3)(c) + (4)(d). The Examiner's attention is directed to any textbook on matrix multiplication and/or "Matrix Multiplication," *http://en.wikipedia.org/wiki/Matrix_multiplication*, March 31, 2010. Therefore, rather than "one scalar per row" of the base matrix as required by claim 1, Equation 12 of *Kishigami* teaches more than one scalar per row of unitary matrix Q_M since a(θ) has M elements, and M>1 (col. 4 lines 1-51).

The Examiner's attention is directed to paragraphs [0035] – [0040] and [0042] – [0047] of the present published application for an example of "selecting at least one different combination of scalars, each combination including at least one scalar for at least one row of the base matrix, one scalar per row" and then multiplying a single selected scalar per row of the base matrix to form the steering matrix. For example, "for an NxN base matrix, each of rows 2 through N of the base matrix may be independently multiplied with *one* of K different possible scalars" (paragraph [0049] lines 1-3, emphasis added).

Furthermore, Applicants respectfully submit that a person having ordinary skill in the art would not consider a vector as a "combination of scalars" as recited in independent claims 1, 13, 17, 21, 34, 39, 42, 47, 50, and 53-55. A vector can be defined as "a one-dimensional array" (*American Heritage Dictionary, 2nd College Edition*. Boston: Houghton Mifflin Company, 1991). In contrast, a combination of scalars is not an array, but is simply a set of real or complex values (paragraph [0072] of the present application). For example, the combination of scalars may include "any one of K possible scalars" where "K may be four, and the four possible scalars may be +1, -1, +j, and –j." *Id.* Therefore, steering vector $a(\theta)$ does not teach a combination of scalars.

For at least these reasons, *Kishigami* fails to anticipate or suggest independent claims 1, 13, 17, 21, 34, 39, 42, 47, 50, and 53-55. Accordingly, Applicants submit these claims and their dependents are allowable over the art of record and request withdrawal of this rejection.

Claim Rejections - 35 U.S.C. § 103

Claims 12 and 53-55 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Kishigami*. Claim 4 is rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Kishigami* in view of Craw ("The Fourier Matrix," December 2003 http://www.maths.abdn.ac.uk/~igc/tch/eg1006/notes/node123.html). Claims 11 and 13 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Kishigami*. Claims 22-23 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Kishigami* in view of *Khatri* (U.S. Patent No. 7,020,490). Claims 42 and 45-52 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Kishigami* in view of *Khayrallah et al.* (U.S. Patent No. 6,711,124, hereinafter, "*Khayrallah*"). Claims 43-44 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Kishigami* in view of *Khayrallah* in view of *Khatri*.

Applicants respectfully submit, however, that each of these claims includes limitations discussed above, which are not taught in *Kishigami*. Applicants further submit that none of these additional references overcomes the shortcomings in the teachings of *Kishigami* discussed above. Accordingly, Applicants submit these claims are also allowable over the art of record and request withdrawal of these rejections.

Therefore, the claims are believed to be allowable over the art of record, and allowance of the claims is respectfully requested.

CONCLUSION

Therefore, for at least the reasons presented above with respect to all of the pending claims subsequent to entry of this response, Applicants assert that all claims are patentably distinct from all of the art of record. All objections and rejections having been addressed, it is respectfully submitted that this application is in condition for allowance and a Notice to that effect is earnestly solicited. If any points remain in issue that the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Charge Statement: For this application, the Commissioner is hereby authorized to charge any required fees or credit any overpayment to Deposit Account 17-0026.

Respectfully submitted,
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